

ABSTRACT OF THE DISCLOSURE

A MEMS based thermoacoustic cryo-cooler for thermal management of cryogenic electronic devices. The cryogenic cooling system can be integrated directly into a cryogenic electronic device. A vertical comb-drive provides an acoustic source through a driving plate to a resonant tube. By exciting a standing wave within the resonant tube, a temperature difference develops across a stack in the tube, thereby enabling heat exchange between heat exchangers. A tapered resonant tube improves the efficiency of the cooling system, compared with a simple cylinder configuration, leading to reduced harmonics and strong standing waves.